Medical, psychosocial, and treatment predictors of opioid overdose among high risk opioid users

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HIGHLIGHTS

- Drug overdoses are the leading cause of accidental death in the United States.
- An exploratory examination of the factors associated with past opioid overdose.
- Witnessing friends overdose and having hepatitis C lead to greater overdose risk.
- Study will enable targeted treatment interventions to prevent an opioid overdoses.

ARTICLE INFO

ABSTRACT

Introduction: Drug overdoses are the leading cause of accidental death in the United States. It is imperative to explore predictors of opioid overdose in order to facilitate targeted treatment and prevention efforts. The present study was conducted as an exploratory examination of the factors associated with having a past opioid overdose.
Methods: Participants ($N = 244$) from substance treatment facilities, inpatient services following ER admittance, or involved within the drug court system and who reported opioid use in the past 6 months were recruited in this study. Measures of opioid use and history were used to determine characteristics associated with previous experience of a non-fatal opioid overdose.
Results: Opioid users who were Caucasian and used a combination of prescription opioids and heroin were more likely to have experienced a prior overdose. Opioid user characteristics associated with greater odds of experiencing a prior overdose included: witnessing a friend overdose (OR 4.21), having chronic hepatitis C virus (HCV) infection (OR 2.44), reporting a higher frequency of buprenorphine treatment episodes (OR 1.55), and having a higher frequency of witnessing others overdose (OR 1.42). Greater frequency of methadone treatment episodes was related to decreased odds of experiencing an overdose (OR 0.67).
Conclusion: Overall, this study demonstrated certain demographic and drug use factors associated with elevated risk for an overdose. Understanding the risk factors associated with drug overdose can lead to targeted naloxone training and distribution to prevent fatal overdoses.

1. Introduction

The opioid epidemic continues to present a serious and substantial public health burden in the US. Rates of drug overdose deaths and overdose related hospitalizations have been increasing, and these trends are seen in both urban and rural areas (Martins, Sampson, Cerdá, & Galea, 2015). Drug overdose deaths almost tripled from 1999 to 2014 (Rudd, Seth, David, & Scholl, 2016), and 52,404 deaths occurred in 2015 due to drug overdoses, most of which (63.1%) involved an opioid. From 2010 to 2015, among all overdose deaths, those involving heroin increased three-fold, from 8% to 25%, those from synthetic opioids, such as fentanyl, grew substantially from 8% to 18%, and those involving natural and semisynthetic opioids such as oxycodone, while slightly decreasing over the same period (from 29% in 2010 to 24% in 2015), continue to represent a high proportion of overdose deaths (Hedegaard, Warner, & Miniño, 2017).

With the ongoing increase in opioid overdose related hospitalizations and mortality, it is imperative to associated characteristics of opioid overdose to enhance treatment and prevention efforts and reduce preventable deaths. Previous research has shown that higher risk of overdose is associated with being white, educated, having a lower income and being homeless or having unstable housing (Boscarino et al., 2016; Cropsey et al., 2013; Hedegaard et al., 2017; Calvo et al., 2017; Martins et al., 2015). It is well-documented that certain groups have much higher rates of drug overdose compared to the population as a whole, including: individuals recently released from the criminal justice system (Cropsey et al., 2013; Martins et al., 2015; Binswanger et al., 2016; Binswanger, Blatchford, Mueller, and Stern, 1999; Binswanger et al., 2007), individuals recently released from substance abuse treatment (Britton, Wines, & Conner, 2010; Martins, Sampson, Cerdá, and Galea, 2015), individuals with chronic pain (Britton, Wines, & Conner, 2010; Coffin et al., 2007; Dunn, Barrett, Fingerhood, & Bigelow, 2016), and individuals under psychological distress or with psychiatric disorders (Brady, Giglio, Keyes, DiMaggio, & Li, 2017; Calvo et al., 2017; Martins et al., 2015).

Injection drug use is a well-established risk factor for overdose (Martins et al., 2015; Britton et al., 2010; Man, Best, Gossop, Noble, & Strang, 2002). In a small qualitative study, among young adults almost all within the heroin and prescription opioid use group had used prescription opioids prior to heroin (Frank et al., 2015). Individuals with a recent overdose are also more likely to have engaged in unsafe injection practices, putting them at increased risk for transmittable infections such as HIV and HCV(Coffin et al., 2007), with previous research indicating rates of HCV as high as 70% among opioid users (Weaver, Cropsey, and Fox, 2005). Opioid users are a high-risk group of drug users who experience the most personal overdoses as well as witnessed overdoses (Coffin et al., 2007; Bohnert et al., 2012; Man et al., 2002). Nearly 80% of those who had experienced a previous opioid overdose reported witnessing an overdose (Cropsey et al., 2013).

Therefore, the purpose of the present study was to conduct an exploratory examination of the factors associated with having a past opioid overdose. Experiencing a past overdose has been established as a strong risk factor for having another potentially fatal overdose (Coffin et al., 2007; Martins et al., 2015; Caudarella, Milloy, Kerr, Wood, & Hayashi, 2016; Britton et al., 2010). This signifies the importance of targeted treatment and prevention efforts for this population in order to stop the recurring cycle of multiple overdoses. We recruited individuals at high risk for opioid overdose from several community locations including an inpatient psychiatric unit following ER admittance, a criminal justice location, and a residential drug treatment facility. All participants also received overdose education and a naloxone kit. In particular, we focused on medical, psychosocial and past treatment experiences as predictors of past overdose experiences. We were interested in determining if there were any differences in overdose risk by recruitment site as well as other medical and psychiatric risk factors.

2. Methods

2.1. Participants

Data were acquired between November 2015 and July 2017 from an on-going study to determine the impact of the distribution of naloxone kits to individuals at high risk for opioid overdose. A total of 402 participants were screened for this study. Of those screened, 28 were ineligible to participate and 131 chose not to participate in this study due to either disinterest in receiving Naloxone or missed scheduled appointments. All included participants (*N* = 247) were considered at high-risk of opioid overdose as they were recruited from sites providing opioid addiction treatment, including a residential drug treatment facility (43.3%), inpatient treatment following ER admittance (25%), and criminal justice supervision (31.7%). Participants were 56.9% male (Mean age = 33.66 years), primarily Caucasian (88.7%) or African

American (9.7%) and living with others (87%). The majority of participants endorsed both heroin and prescription opioid use (86.5%), and were never married (62.3%), divorced/separated (18.6%), or married (16.2%). Highest education attainment included less than high school (18.6%) and high school diploma/GED (58.9%).

Inclusion criteria included being 18 years or older, having current or past misuse of opioids within the past 6 months, agreeing to give both personal contact information and that of two close friend or family members for follow-up phone calls, and having an available friend or family member willing to complete the naloxone training with the participant. The friend or family member was required to have all the same inclusion criteria, except they were not required to have regular use of opioids to be included in the study. If the Friend/Family member met the opioid use criteria as well, they were treated as a participant and provided a naloxone kit as well; non-users were just provided with training to recognize opioid overdose and administer naloxone. Participants were excluded from the study if they were non-English speaking, were legally blind such that they could not read or watch an education video, or an allergy to naloxone (Narcan).

2.2. Measures

Participant demographics were obtained through self-report, including: age, race, gender, current marital status, highest level of education completed, current living situation, and employment status. Participants' medical, psychosocial and opioid use characteristics were assessed using an Opioid Use Questionnaire at baseline appointment. The Opioid Use Questionnaire is a self-report 30-item measure that assess chronic medical conditions, STIs, past and current opioid misuse, nonfatal opioid overdose experiences, and frequency of every distinct opioid treatment episode including, buprenorphine, methadone maintenance clinics, residential drug rehabilitation programs, and intensive outpatient treatment. This survey was developed and used in a previous study of opioid overdose (Cropsey et al., 2013). All treatment variables were answered on a 5-point scale ranging from 0 (*never*) to 4 (*more than three times*).

2.3. Procedure

All participants were recruited via flyers or provider referrals at the recruitment locations, including a residential drug treatment facility, inpatient treatment following ER admittance, and criminal justice supervision. All study participants were assessed and trained in dyads. The individual at high risk for opioid overdose and their friend or family member were screened and scheduled for baseline assessment and naloxone training. At baseline appointment, participants provided their informed consent and completed all baseline questionnaires.

2.4. Data analytic approach

All data for the present study were utilized from the baseline appointment. Participants who did not complete at least 50% of the questionnaire or indicated no opioid use were excluded from analysis (*N* = 3). A total of 244 opioid users were included in subsequent analyses. No significant differences were found between those included in the study (responders) and those who choose not to participate (nonresponders) on collected demographic variables (i.e., age and recruitment location). Opioid overdose was dichotomized as self-reported lifetime experience of a nonfatal opioid overdose. Chi-square analyses were conducted to examine differences on past nonfatal overdose experience among demographic characteristics. A hierarchical logistic regression analysis was used to determine predictors of lifetime experience of a nonfatal overdose experience while controlling for demographic variables (age, gender, and race). Prior to analysis all necessary logistic regression assumptions were examined and deemed not violated. Only 1 participant indicated positive HIV status, and therefore this predictor was dropped from analysis.